525 Rec'd PCT/PTO 20 NOV 2000

FORM PTO-1390 (REV 12-29-99)

U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER
Filed: November 20, 2000
785.39330X00

U S APPLICATION NO (If known, see 37 CFR 1 5)
09/700796

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/02184	13 March 2000 (13.03.00)	20 March 1999 (20.03.99)

TITLE OF INVENTION METHOD AND DEVICE FOR EXAMINING OPTICAL STORAGE MEDIA MATERIALS

APPLICANT(S) FOR DO/EO/US MANSURIPUR, MASUD; ERWIN, KEVIN; BLETSCHER, WARREN JR. and MANSURIPUR, Masud

OIPE JC139 NOV 2 0 2000 PATENT & TRADEMARK OFFICE

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U S C. 371
3. [ ] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [ ] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [ ] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [X] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [ ] A substitute specification.
15. [X] A change of power of attorney and/or address letter.
16. [X] Other items or information:

Figure 1
Credit Card Payment Form

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U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
09/700796	PCT/EP00/02184	785.39330X00

17. [X] The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

	CALCULATIONS	PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$970.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$840.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $690.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$670.00**		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) **$96.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 0.00	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	29 - 20 =	9	X **$18.00**	$ 162.00	
Independent claims	1 - 3 =	0	X **$78.00**	$ 0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$260.00**	$ 0.00	

TOTAL OF ABOVE CALCULATIONS =	$ 1,022.00	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also by filed (Note 37 CFR 1.9, 1.27, 1.28).	$ 0.00	
SUBTOTAL =	$ 1,022.00	
Processing fee of **$130.00** for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +	$ 0.00	
TOTAL NATIONAL FEE =	$ 1,022.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +	$ 0.00	
TOTAL FEES ENCLOSED =	$ 1,022.00	
	Amount to be refunded:	$
	charged:	$

a. [X] A check in the amount of $ 1,022.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. ______________ in the amount of $______________ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 01-2135. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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Donald E. Stout
SIGNATURE

Donald E. Stout
NAME

26,422
REGISTRATION NUMBER

09/700796

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785.39330X00
TUIO99R01US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Masud MANSURIPUR et al

Serial No.: To Be Assigned

Filed: November 20, 2000
(Concurrently Herewith)

For: METHOD AND DEVICE FOR EXAMINING OPTICAL STORAGE MEDIA MATERIALS

Art Unit: To Be Assigned

Examiner: To Be Assigned

PRELIMINARY AMENDMENT

Assistant Commissioner
for Patents
Washington, D. C. 20231

November 20, 2000

Sir:

Prior to examination of the above-identified application, please amend the claims as follows:

IN THE CLAIMS:

Please cancel original claims 1-8 without disclaimer or prejudice and insert new claims 9-16 as follows:

--9. A process for examining an optical storage medium material having a first continuous laser beam directed at the surface of said storage medium, said laser beam reflected from said surface being utilized to examine a surface reflectivity before, during and after a second laser beam effects a change in reflection behavior of the surface at least at a site of a reflection event of the first laser beam.

10. The process according to claim 9, wherein:

an energy input occurs simultaneously with said reflection event.

11. The process according to claim 9, wherein:

said second laser beam is pulse operated and has a different wavelength and/or different intensity than said first light beam.

12. The process according to claim 9, wherein:

a magnet system which exposes said storage medium to one of a constant or a temporally variable magnetic field provided at a site of said optical storage medium.

13. A process according to claim 9, wherein:

said storage medium undergoes a physical phase jump at a site of an energy input due to the energy input.

14. A process according to claim 9, wherein:

said storage medium undergoes a change in magnetic properties thereof due to an energy input.

15. A process according to claim 9, wherein:

intensity and/or polarization of said reflected beam is measured for examining said surface reflectivity.

16. A process according to claim 9, wherein:

radiation of said second laser beam reflected at said surface is utilized for evaluation.

17. The process according to claim 10, wherein:

said second laser beam is pulse operated and has a different wavelength and/or different intensity than said first light beam.

18. The process according to claim 10, wherein:

a magnet system which exposes said storage medium to one of a constant or a temporally variable magnetic field provided at a site of said optical storage medium.

19. The process according to claim 11, wherein:

a magnet system which exposes said storage medium to one of a constant or a temporally variable magnetic field provided at a site of said optical storage medium.

20. A process according to claim 10, wherein:

said storage medium undergoes a physical phase jump at a site of the energy input due to the energy input.

21. A process according to claim 11, wherein:

said storage medium undergoes a physical phase jump at a site of an energy input due to the energy input.

22. A process according to claim 12, wherein:

said storage medium undergoes a physical phase jump at a site of an energy input due to the energy input.

23. A process according to claim 10, wherein:

said storage medium undergoes a change in magnetic properties thereof due to the energy input.

24. A process according to claim 11, wherein:

said storage medium undergoes a change in magnetic properties thereof due to an energy input.

25. A process according to claim 12, wherein:

said storage medium undergoes a change in magnetic properties thereof due to an energy input.

26. A process according to claim 13, wherein:

said storage medium undergoes a change in magnetic properties thereof due to an energy input.

27. A process according to claim 10, wherein:

intensity and/or polarization of said reflected beam is measured for examining said surface reflectivity.

28. A process according to claim 11, wherein:

intensity and/or polarization of said reflected beam is measured for examining said surface reflectivity.

29. A process according to claim 12, wherein:

intensity and/or polarization of said reflected beam is measured for examining said surface reflectivity.

30. A process according to claim 13, wherein:

intensity and/or polarization of said reflected beam is measured for examining said surface reflectivity.

31. A process according to claim 14, wherein:

intensity and/or polarization of said reflected beam is measured for examining said surface reflectivity.

32. A process according to claim 10, wherein:

radiation of said second laser beam reflected at said surface is utilized for evaluation.

33. A process according to claim 11, wherein:

radiation of said second laser beam reflected at said surface is utilized for evaluation.

34. A process according to claim 12, wherein:

radiation of said second laser beam reflected at said surface is utilized for evaluation.

35. A process according to claim 13, wherein:

radiation of said second laser beam reflected at said surface is utilized for evaluation.

36. A process according to claim 14, wherein:

radiation of said second laser beam reflected at said surface is utilized for evaluation.

37. A process according to claim 15, wherein:

radiation of said second laser beam reflected at said surface is utilized for evaluation.--

REMARKS

The claims have been amended to remove the multiple dependent claims before filing fee calculation and to improve their form for examination.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (785.39330X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

Donald E. Stout
Registration No. 26,422
(703) 312-6600

Attachment

DES:dlh

1/PRTS

09/700796

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Method and Device for Examining Optical Storage Media Materials

Technical Field

The present invention relates to a method and a device for examining optical storage media materials.

Background of the Invention

Read-only or rewritable optical storage media are based on materials or layers which alter their optical or magnetic properties upon light irradiation, in particular laser light, and, also, with the aid of a magnetic field. Once a material has undergone such permanent alteration, this change can be subsequently scanned with light or a magnetic sensor. In read-only storage media, this change is irreversible whereas in rewritable storage media it must be reversible, i.e eraseable.

The goal of development in producing such storage media is primarily to examine materials and layers to determine whether light or a combination of light and magnetic field can cause irreversible or reversible changes, which for their part can be detected with light or a magnetic sensor. It is particularly important to examine the dynamic behavior of the materials and layers during energy input in the form of light or a magnetic field, because, in order to obtain great storage density and great writing speed, it is necessary to make very small marks with very short laser pulses.

A typical example of such modern storage media are so-called "phase-change disks" as represented by the CD-RW, i.e. rewritable disk (Marchant: "Optical Recording", Addison-Wesley). The material employed for this purpose, which serves as an information carrier (e.g. chalcogenides, ArZn compounds), may be present in various physical phases. Usual is a stable crystalline phase and a metastable amorphous phase, which possess different optical properties. At first this material is in a in crystalline phase in which it still possesses great optical

reflectivity. Short laser pulse irradiation heats the material locally and it is melted at that site; however, due to the sudden termination of the laser pulse, the material remains permanently in an amorphous phase, which possesses lower reflectivity than the crystalline phase. The sudden termination of the laser beam respectively the sudden termination of energy input in the form of magnetic energy, which turns into thermal energy in the material, leads to a so-called quenching process in the material which, prevents continuous reconversion into the crystalline phase.

As a result, marks written in the material with this process appear as dark dots (amorphous points) on a light surface (crystalline area).

On the other hand, if a continuous laser beam is directed at the marked or unmarked surface, the quenching process does not occur, i.e. the phase change leading to a permanent amorphous state does not occur, because the material can cool slowly and thus return to the crystalline phase. In this way, once marked points can also be erased.

Description of the Invention

The object of the present invention is to provide a process for examining the material of an optical storage medium permitting obtaining reliable information concerning the surface properties of optical storage media. In particular, it should permit in-situ analysis making it possible to immediately draw conclusions about the effect on the reflection behavior of the storage medium and, therefore,.on the occurring surface effects when a certain energy input occurs on the surface of the storage medium. It should be possible to effect dynamic changes in the materials suited for optical storage and observe their dynamics during the changing process.

The solution of this object is set forth in claim 1. Advantageous features further developing the inventive idea are the subject matter of the subclaims.

A key element of the present invention is to provide a process for examining the material of an optical storage medium in such a manner that a first continuous laser beam is directed at the surface of the storage medium. The beam of this laser beam reflected at the surface of the storage medium is used to examine surface reflectivity. Furthermore, a second laser beam at least at the site of the reflection event of the first laser beam effects a change in the reflection behavior of the surface.
The term reflection event refers to the surface area on the optical storage medium where the first laser beam for surface analysis is reflected.

The continuous laser beam directed at the surface serves as the reading beam whose return reflection from the to-be-examined material can be measured with regard to intensity and polarization.

Moreover, a magnetic field system in the form of an electromagnet, which exposes the optical memory medium to a temporally constant or variable magnetic field, can be provided.

Brief Description of the Drawing

The present invention is made more apparent in the following using a preferred embodiment with reference to the accompanying drawing be way of example without intention of limiting the scope or spirit of the overall inventive idea.

Fig. 1 shows the arrangement for examining an optical storage medium material

Ways to Carry Out the Invention, Commercial Applicability

For generating the writing beam and the reading beam, there are two laser sources (1) and (2) having different wavelengths, with the arrangement being such that the selection of writing source or reading source is at will. The two linear p-polarized laser beams are directed by means of a dichroic mirror (3) at a common optical axis. They pass through a semi-reflecting polarizing beam

splitter (4), whose splitting ratio is for example 80%/20% (80% transmission of p-polarized light, 20% reflection of p-polarized light, 100% reflection of s-polarized light). After this, the laser beams pass through a delaying plate (5), which usually is designed as a variable, liquid- crystal-based delaying plate.

For testing phase-change materials, delaying time is set to a quarter of the laser wavelength - the laser beams are circularly polarized.

For testing magneto-optical materials no delaying time is provided, but only a settable correction of the ellipticity of the reflected light is provided.

Both laser beams are then coupled into a microscope arrangement by means of a second dichroic mirror (6), which reflects the two wavelengths but permits the remaining visible spectral range to pass. Lens (7) focuses the two beams diffraction limited onto the to-be-examined material (8).

The light reflected back from the material, in the case of magneto-optical materials also changing its polarization, returns back via the dichroic mirror (6) through delaying plate (5). There the circularly polarized light is converted into linear s-polarized light, respectively the ellipticity of the light is corrected. The polarizing beam splitter (4) couples out the light reflected back from the material in direction of the detectors. It passes through a $\lambda/2$ delaying plate (9), the purpose of which is, if magnetooptical media are used, to balance the intensity of the two signals on the detectors for good differentiation. A polarizing beam splitter (10) divides the two polarization directions. Both beams are then dispersed into their wavelength components by two prisms (11) and (12) in such a manner that the material reflexes of the two laser beams which previously ran on one optical axis can be directed at different detectors. The material reflexes are directed via the two lenses (13 and 14) to two identical detectors (15 and 16) respectively, which lie close together. In this manner, the user obtains four signals separated according to laser wavelength and according to polarization.

Additional devices, such as those usual for microscopes supplement the arrangment: the sample (8) can be observed through eyepieces or with a

camera (17). In this way, images of the changes in the surface can be obtained and optically measured. A white light source coupled into the microscope beam path serves as the incident light source (18). Placing a polarizer (19) in the beam path of the white light source and placing an analyzer (20) in the observation beam path permits polarization-microscopy of the surface.

The sample is located on a motor driven XY-table (21) so that several measuring points can be set automatically for determining the measuring results statistically. Under the sample (8) is a strong electromagnet (22) which generates the magnetic field for examining the magnetooptic layers.

The device is controlled by a central computer. If a measurement is started, first one of the two lasers is continuously activated with little power. Then the second laser is made to emit an pulse according to the user´s specifications with a prescribed amplitude characteristic and a prescribed duration (e.g. a rectangular pulse). The four signals (S_{s1},S_{S2},S_{p1}, S_{p2}) received by the detectors (15,16) are recorded before, during and after the laser pulse by a transient recorder. The temporal course of the signals can yield information about the dynamically optical behavior of the material. Then a new site on the material of sample (8) can be approached to repeat the procedure or the intensity, duration or form of the pulse can be changed.

In the case of solely reflecting materials that do not influence polarization, the two signals of one wavelength can be added. In any event, the polarization dependency of the material reflection (e.g. double refraction of a material) can be observed. In the case, of magneto-optical materials, the two signals of a wavelength are subtracted from each other to obtain the magneto-optical differential signals.

Moreover, the sample can be placed on a heating or cooling surface (e.g. Peltier) element to measure the thermal dependence of the optical properties.

The advantages of the measuring process are:

This process permits examining changes in the optical properties of surfaces of materials by means of laser irradiation and, under circumstances, simultaneous exposure to a magnetic field, allowing observation of the optical properties before, during and after the exposure of the light pulse independent of the light pulse.

Employing two lasers permits changing at will the temporal course and intensity course of the irradiated laser pulse without changing the properties of the reading pulse and therefore without changing the yielded signal.

The optical properties can be examined with two different laser wavelengths alternately as a writing beam or a reading beam.

The measuring device permits examining materials and layers under light-transmitting substrates (e.g. CD-RW). Moreover, the optical properties can be examined for dependence on temperature.

The optical properties can also be examined for their polarization effects (double refraction, Kerr rotation).

During and after measurement, the change in the surface can be observed and/or measured microscopically and with a polarization microscope.

The instrument can be used as a scanning microscope in that the reading detector signal is measured during a XY movement of the sample table. In this way, the size of the marks on the material can be determined not only optically but also polarization dependence. Moreover, mark boundaries can be distinctly determined.

In conjunction with a magnet, the magnetizing hysteresis curve of the magneto-optical materials can be measured.

All the aforementioned measuring functions can be carried out quickly in succession without major modification of the arrangement and, in particular, in one arrangement.

Reference Numbers

1 Laser
2 Laser
3 Dichroic mirror
4 Beam splitter
5 Delaying plate
6 Dichroic mirror
7 Lens
8 Storage medium, to-be-examined material
9 λ/2 delaying plate
10 Polarizing beam splitter
11 Prism
12 Prism
13 Optical lens
14 Optical lens
15 Detector
16 Detector
17 Camera
18 Incident light source
19 Polarizer
20 Analyzer
22 Electromagnet

What is Claimed is:

1. A process for examining an optical storage medium material having a first continuous laser beam directed at the surface of said storage medium, said laser beam reflected from said surface being utilized to examine the surface reflectivity and having a second laser beam which effects a change in the surface´s reflection behavior at least at the site of the reflection event of the first laser beam.

2. The process according to claim 1,
wherein the energy input occurring simultaneously with said reflection event.

3. The process according to claim 1 or 2,
wherein said second laser beam being pulse operated and a having a different wavelength and/or different intensity than said first light beam.

4. The process according to one of the claims 1 to 3,
wherein a magnet system which exposes said storage medium to a constant or a temporally variable magnetic field being provided at the site of said optical storage medium.

5. A process according to one of the claims 1 to 4,
wherein said storage medium undergoing a physical rapid phase jump at the site of the energy input due to said energy input.

6. A process according to one of the claims 1 to 5,
wherein said storage medium undergoing a change in its magnetic properties due to said energy input.

7. A process according to one of the claims 1 to 6,
wherein the intensity and/or polarization of said reflected beam being measured for examining said surface reflectivity.

8. A process according to one of the claims 1 to 7,
wherein the radiation of said second light beam reflected at said surface being utilized for evaluation.

Summary

The invention concerns a process for examining an optical storage medium material having a first continuous laser beam directed at the surface of said storage medium, said laser beam reflected from said surface being utilized to examine the surface reflectivity and having a second laser beam which effects a change in the surface´s reflection behavior at least at the site of the reflection event of the first laser beam.

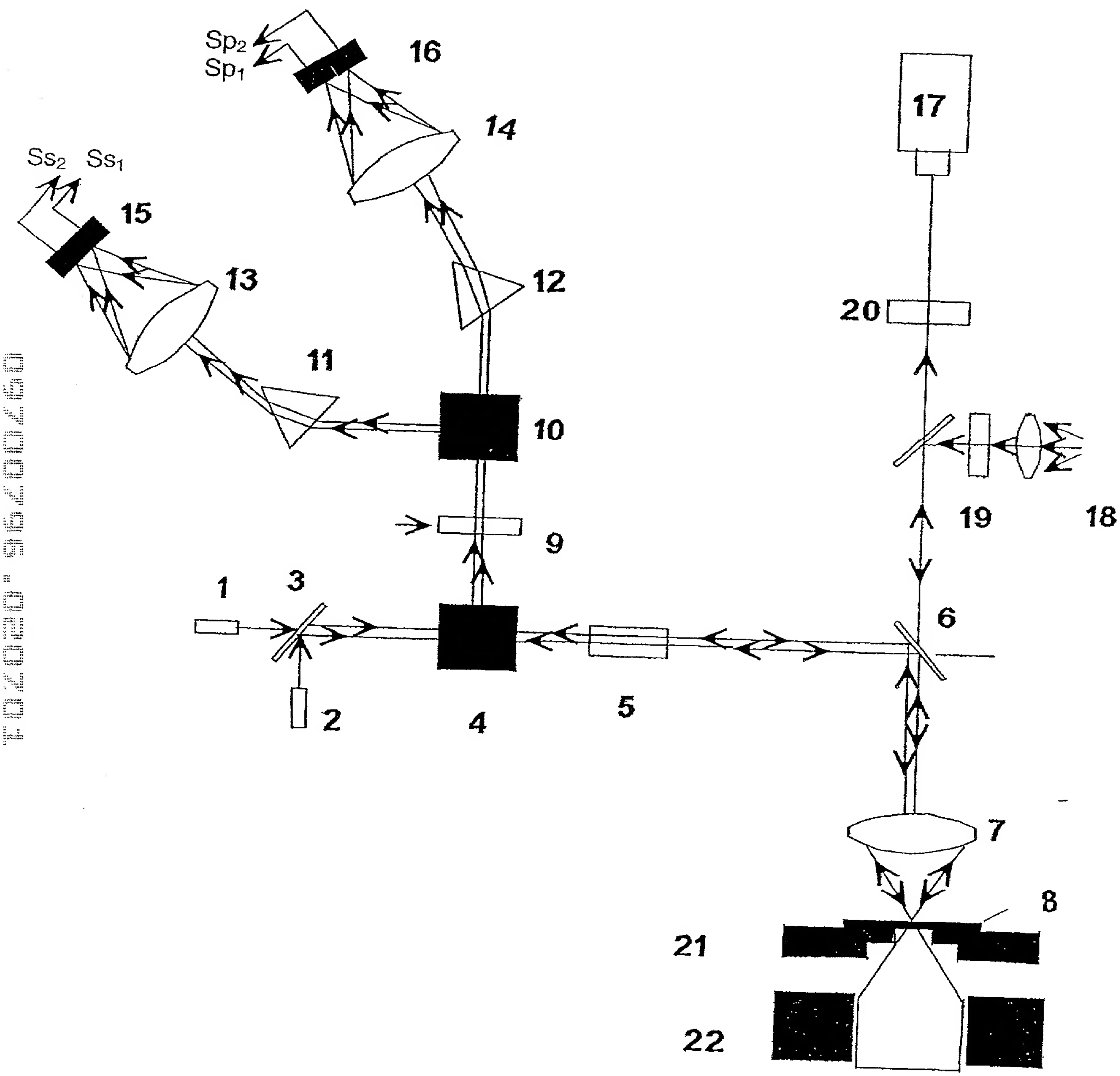

Fig. 1

785.39330X00 (TUIO99RO1US)

DECLARATION AND POWER OF ATTORNEY FILED WITH U.S. DESIGNATED OFFICE UNDER 35 U.S.C. 371(c)(4)

FEB 07 2001

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent on the invention entitled:

METHOD AND DEVICE FOR EXAMINING OPTICAL STORAGE MEDIA MATERIALS

the specification of which was filed as PCT International Application No. PCT/EP00/02184 filed March 20, 1999 and was amended on November 20, 2000.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

(Number)	(Country)	(Day/Month/Year Filed)	Priority Claimed: Yes	Priority Claimed: No
DE 199 12 589.9	Germany	20 March 1999	☒	☐
			☐	☐
			☐	☐
			☐	☐

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status: patented, pending, abandoned)

I hereby appoint as principal attorneys: Donald R. Antonelli, Reg. No. 20,296; David T. Terry, Reg. No. 20,178; Melvin Kraus, Reg. No. 22,466; William I. Solomon, Reg. No. 28,565; Gregory E. Montone, Reg. No. 28,141; Ronald J. Shore, Reg. No. 28,577; Donald E. Stout, Reg. No. 26,422; Alan E. Schiavelli, Reg. No. 32,087; James N. Dresser, Reg. No. 22,973, Carl I. Brundidge, Reg. No. 29,621; Paul J. Skwierawski, Reg. No. 32,173; and Robert M. Bauer, Reg. No. 34,487; to prosecute and transact all business connected with this application and any related United States and international applications.

Please Direct all Communications to:	Direct Telephone Calls To:
Antonelli, Terry, Stout & Kraus, LLP Suite 1800 1300 North Seventeenth Street Arlington, Virginia 22209	Phone: (703) 312-6600 Fax: (703) 312-6666

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

(Full Name) (Signature)

1-00

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2-00

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(Full Name) (Signature)

Date ______ Inventor ______

Residence ______ Citizenship ______

Post Office Address ______